TETANUS

DISEASE REPORTING

In Washington

DOH receives 0 to 2 reports of tetanus per year; a quarter of the cases reported to DOH result in death.

Purpose of reporting and surveillance

- To assure early evaluation and, where appropriate, treatment with tetanus-diphtheria toxoid (Td) and/or tetanus immune globulin (TIG).
- To identify groups and areas in which risk of disease is highest (due to under-immunization, occupation, other practices, etc.) to focus prevention efforts.

Reporting requirements

- Health care providers: notifiable to Local Health Jurisdiction within 3 work days
- Hospitals: notifiable to Local Health Jurisdiction within 3 work days
- Laboratories: no requirements for reporting
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days

CASE DEFINITION FOR SURVEILLANCE

Clinical criteria for diagnosis

Acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck) and generalized muscle spasms without other apparent medical cause.

Laboratory criteria for diagnosis

- None.

Case definition

- Confirmed: a clinically compatible case, as reported by a health-care professional.

A. DESCRIPTION

1. Identification

An acute disease induced by an exotoxin of the tetanus bacillus, which grows anaerobically at the site of an injury. The disease is characterized by painful muscular contractions, primarily of the masseter and neck muscles, secondarily of trunk muscles. A common first sign suggestive of tetanus in older children and adults is abdominal rigidity, though rigidity is sometimes confined to the region of injury. Generalized spasms occur, frequently induced by sensory stimuli; typical features of the tetanic spasm are the position of opisthotonus and the facial expression known as risus sardonicus. History of an injury or apparent portal of entry may be lacking. The case-fatality rate ranges from 10% to 90%, it is highest in infants and the elderly, and varies inversely with the length of the incubation period and the availability of experienced intensive care unit personnel and resources.

Attempts at laboratory confirmation are of little help. The organism is rarely recovered from the site of infection, and usually there is no detectable antibody response.

2. Infectious Agent

Clostridium tetani, the tetanus bacillus.

3. Worldwide Occurrence

Sporadic and relatively uncommon in the US and most industrial countries. During the period 1995-1997, there were 124 cases reported from 33 states in the US; 60% occurred in persons aged 20-59 years; 35% were 60 years of age or older; and 5% were less than 20 years old. The case-fatality rate increased with age from 2.3% in those aged 20-39 years to 18% for persons over 60 years of age. Tetanus in injecting drug users with no known acute injury accounted for 11% of the 124 cases compared with 3.6% during 1991-1994. An average of 50 cases per year continue to be reported to CDC. The disease is more common in agricultural regions and in underdeveloped areas where contact with animal excreta is more likely and immunization is inadequate; an important cause of death in many countries of Asia, Africa and South America, especially in rural and tropical areas where tetanus neonatorum is common (see below). Parenteral use of drugs by addicts, particularly intramuscular or subcutaneous use, can result in individual cases and occasional circumscribed outbreaks.

4. Reservoir

Intestines of horses and other animals, including humans, in which the organism is a harmless normal inhabitant. Soil or fomites contaminated with animal and human feces. Tetanus spores are ubiquitous in the environment and can contaminate wounds of all types.

5. Mode of Transmission

Tetanus spores are introduced into the body, usually through a puncture wound contaminated with soil, street dust or animal or human feces; through lacerations, burns and trivial or unnoticed wounds; or by injected contaminated street drugs. Tetanus occasionally follows surgical procedures, which include circumcision. The presence of necrotic tissue and/or foreign bodies favors growth of the anaerobic pathogen. Cases have followed injuries considered too trivial for medical consultation.

6. Incubation period

Usually 3-21 days, although it may range from 1 day to several months, depending on the character, extent and location of the wound; average 10 days. Most cases occur within 14 days. In general, shorter incubation periods are associated with more heavily contaminated wounds, more severe disease and a worse prognosis.

7. Period of communicability

Not directly transmitted from person to person.

8. Susceptibility and resistance

Susceptibility is general. Active immunity is induced by tetanus toxoid and persists for at least 10 years after full immunization; transient passive immunity follows injection of tetanus immune globulin (TIG) or tetanus antitoxin (equine origin). Infants of actively immunized mothers acquire passive immunity that protects them from neonatal tetanus. Recovery from tetanus may not result in immunity; second attacks can occur. Primary immunization is indicated after recovery.

B. METHODS OF CONTROL

1. Preventive measures:

a. Educate the public on the necessity for complete immunization with tetanus toxoid, the hazards of puncture wounds and closed injuries that are particularly liable to be complicated by tetanus, and the potential need after injury for active and/or passive prophylaxis.
b. Universal active immunization with adsorbed tetanus toxoid, which gives durable protection for at least 10 years; after the initial basic series has been completed, single booster doses elicit high levels of immunity. The toxoid is generally administered together with diphtheria toxoid and pertussis vaccine as a triple (DTP or DTaP) antigen (or double [DT] antigen for children under 7 years with contraindications to pertussis vaccine), or Td for older people. For children 7 years or older, preparations that include *Haemophilus influenzae* type b conjugate vaccines (DTP-Hib) are available in the US, as are preparations that include

acellular pertussis vaccine (DTaP). In some countries, DTP, DT and T are available combined with inactivated polio vaccine. In countries with incomplete immunization programs for children, all pregnant women should receive 2 doses of tetanus toxoid. Nonadsorbed (plain) preparations are less immunogenic for primary immunization or booster shots. Minor local reactions following tetanus toxoid injections are relatively frequent; severe local and systemic reactions are infrequent but do occur, particularly after excessive numbers of prior doses have been given.

i. The schedule recommended for tetanus immunization is the same as for diphtheria (see Diphtheria, B1).
ii. While tetanus toxoid is recommended for universal use regardless of age, it is especially important for workers in contact with soil, sewage and domestic animals; members of the military forces; policemen and others with greater than usual risk of traumatic injury; and older adults who are currently at highest risk for tetanus and tetanus related mortality. Vaccine induced maternal immunity is important in preventing neonatal tetanus.
iii. Active protection should be maintained by administering booster doses of Td every 10 years.
iv. For children and adults who are severely immunocompromised or infected with HIV, tetanus toxoid is indicated in the same schedule and dose as for immunocompetent persons even though the immune response may be suboptimal.

c. Prophylaxis in wound management: Tetanus prophylaxis in patients with wounds is based on careful assessment of whether the wound is clean or contaminated, the immunization status of the patient, proper use of tetanus toxoid and/or TIG (see table, below), wound cleaning and, where required, surgical debridement and the proper use of antibiotics.

i. Those who have been completely immunized who sustain minor and uncontaminated wounds require a booster dose of toxoid only if more than 10 years have elapsed since the last dose was given. For major and/or contaminated wounds, a single booster injection of a tetanus toxoid (preferably Td) should be administered promptly on the day of injury if the patient has not received tetanus toxoid within the preceding 5 years.
ii. Persons who have not completed a full primary series of tetanus toxoid require a dose of toxoid as soon as possible following the wound and may require passive immunization with human TIG if it is a major wound and/or it is contaminated with soil containing animal excreta. DTP/DTaP, DT or Td, as determined by the age of the patient and previous immunization history, should be used at the time of the wound, and ultimately, to complete the primary series.

Passive immunization with at least 250 IU of TIG IM (or 1,500 to 5,000 IU of antitoxin of animal origin if TIG is not available) is indicated for patients with other than clean, minor wounds and a history of no, unknown or fewer than three previous tetanus toxoid doses. When tetanus toxoid and TIG or antitoxin are given concurrently, separate syringes and separate sites must be used.

When antitoxin of animal origin is given, it is essential to avoid anaphylaxis by first injecting 0.02 ml of a 1:100 dilution in physiologic saline intradermally, with a syringe containing adrenaline on hand. Pretest with a 1:1,000 dilution if there has been prior animal serum exposure, together with a similar injection of physiologic saline as a negative control. If after 15-20 minutes there is a wheal with surrounding erythema at least 3 mm larger than the negative control, it is necessary to desensitize the individual. Penicillin given for 7 days may kill *C. tetani* in the wound, but this does not obviate the need for prompt treatment of the wound together with appropriate immunization.

2. Control of patient, contacts and the immediate environment:

a. Report to local health authority.
b. Isolation: None.
c. Concurrent disinfection: None.
d. Quarantine: None.
e. Immunization of contacts: None.
f. Investigation of contacts and source of infection: Case investigation to determine circumstances of injury.
g. Specific treatment: TIG IM in doses of 3,000-6,000 IU. If TIG is not available, tetanus antitoxin (equine origin) in a single large dose should be given IV following appropriate testing for hypersensitivity; IV metronidazole in large doses should be given for 7-14 days. The wound should be debrided widely and excised if possible. Wide debridement of the umbilical stump in neonates is not indicated. Maintain an adequate airway and employ sedation as indicated; muscle relaxant drugs together with tracheostomy or nasotracheal intubation and mechanically assisted respiration may be lifesaving. Active immunization should be initiated concurrently with therapy.

3. Epidemic measures

In the rare outbreak, search for contaminated street drugs.

4. International measures

Up-to-date immunization against tetanus is advised for international travelers.